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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/618,602	07/15/2003	Naoki Matsumoto	010986.52602US	5343

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EXAMINER

ALEJANDRO MULERO, LUZ L

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 04/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/618,602

Applicant(s)

MATSUMOTO ET AL.

Examiner

Luz L. Alejandro

Art Unit

1763

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 February 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-13 and 15-25 is/are pending in the application.
- 4a) Of the above claim(s) 1-12, 18, 20 and 24 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13, 15-17, 19, 21-23, 25 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 13, 16, 23, and 25 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi et al., U.S. Patent 6,469,448 in view of Baldwin, Jr. et al., U.S. Patent 6,280,563.

Taguchi et al. shows the invention substantially as claimed including a plasma processing apparatus for supplying radio-frequency power into a process chamber so as to generate plasma, to thereby treat an object to be processed with the plasma, wherein the process chamber has a top plate with a bias applied which is disposed

opposite to the object to be processed through the medium of a region for generating the plasma.

Taguchi et al. does not expressly disclose where the top plate comprises a metal based or silicon based material. Baldwin, Jr. et al. discloses a top plate 44 with a potential applied which is made of a metal (see fig. 1 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Taguchi et al. so as to have the top plate composed of a metal because, as disclosed by Baldwin, Jr. et al., such a material is suitable for having RF potential applied.

Furthermore, note that at least one metal radio frequency antenna (8 or 9) is disposed, in the process chamber, so as to provide a linear and/or curved line.

Concerning claim 16, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine through routine experimentation the optimum length of the antenna based upon a variety of factors including the desired area of the plasma distribution and such limitation would not lend patentability to the instant application absent a showing of unexpected results.

Regarding claim 23, note that the apparatus includes a susceptor 6 for supporting the object to be processed in the process chamber, and a bias 7 is applicable to the susceptor.

Concerning claim 25, note that in the apparatus of Taguchi et al. modified by Baldwin, Jr. et al., the electric fields are capable of being strengthened by one another

Claims 15 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi et al., U.S. Patent 6,469,448 in view of Baldwin, Jr. et al., U.S. Patent 6,280,563 as applied to claims 13, 16, 23, and 25 above, and further in view of Glukhov, US 2003/0168172.

Taguchi et al. and Baldwin, Jr. et al. are applied as above but do not expressly disclose that the antenna disposed in the process chamber is covered with an insulating material so that the radio-frequency antenna does not directly contact the plasma, and wherein an insulating fluid is circulated between the antenna and the insulating material. Glukhov discloses that the antenna disposed in the process chamber is covered with an insulating material 64 so that the radio-frequency antenna does not directly contact the plasma, and wherein an insulating fluid is circulated between the antenna and the insulating material using tubes 82 (see paragraphs 0035-0036). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Taguchi et al. modified by Baldwin, Jr. et al. in order to cover the antenna with an insulating material and circulate an insulating fluid between the antenna and the insulating material because such a structure will protect the antenna as well as controlling the temperature of the antenna to avoid damage.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi et al., U.S. Patent 6,469,448 in view of Baldwin, Jr. et al., U.S. Patent 6,280,563 as

applied to claims 13, 16, 23, and 25 above, and further in view of Holland et al., U.S. Patent 5,975,013 or Takagi et al., US 2004/0020432.

Taguchi et al. and Baldwin, Jr. et al. are applied as above but do not expressly disclose wherein the thickness or diameter of the radio frequency antenna disposed in the process chamber is changed along with the propagation direction of the radio frequency power.

Holland et al. discloses varying the thickness or diameter of a radio frequency antenna (see fig. 11 and its description), as does Takagi et al. (see fig. 2 and its description). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Taguchi et al. modified by Baldwin, Jr. et al. so as to vary the thickness and/or the diameter of the coil because in such a way a uniform plasma density can be achieved.

Claims 21-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Taguchi et al., U.S. Patent 6,469,448 in view of Baldwin, Jr. et al., U.S. Patent 6,280,563 as applied to claims 13, 16, 23, and 25 above, and further in view of Grimbergen et al., U.S. Patent 6,390,019.

Taguchi et al. and Baldwin, Jr. et al. are applied as above but do not expressly disclose wherein a measuring device is disposed in at least one position of the top plate so as to monitor the state of the generated plasma and the top plate has a plurality of apertures for passing a gas to be supplied to the process chamber. Grimbergen et al. discloses a measuring device 25 which is disposed in the top of the chamber so as to

monitor the state of the generated plasma (see fig. 1 and its description), and a top plate which has a plurality of apertures for passing a gas to be supplied to the process chamber (see, for example, figs. 2 and 3a and their descriptions). In view of this disclosure, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the apparatus of Taguchi et al. modified by Baldwin, Jr. et al. so as to have the measuring device and apertures as suggested by Grimbergen et al. because having the measuring device and apertures in the top plate allows for accurate measurements and uniform distribution of the gas across the workpiece.

Response to Arguments

Applicant's arguments filed 2/13/06 have been fully considered but they are not persuasive. Applicant argues that the references of record fail to disclose the antennas having the same direction of electric current. However, the primary reference of Taguchi clearly shows that the direction of electric current in the antennas will be the same (see, for example, fig. 6).

Conclusion

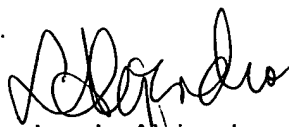
Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Luz L. Alejandro whose telephone number is 571-272-1430. The examiner can normally be reached on Monday to Thursday from 7:30 to 6:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Parviz Hassanzadeh can be reached on 571-272-1435. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Luz L. Alejandro
Primary Examiner
Art Unit 1763

April 11, 2006